

Name: _____

at1121exam_practice: Radicals and Squares (v18)

Question 1

Simplify the radical expressions.

$$\sqrt{18}$$

$$\sqrt{28}$$

$$\sqrt{99}$$

$$\sqrt{3 \cdot 3 \cdot 2}$$

$$3\sqrt{2}$$

$$\sqrt{2 \cdot 2 \cdot 7}$$

$$2\sqrt{7}$$

$$\sqrt{3 \cdot 3 \cdot 11}$$

$$3\sqrt{11}$$

Question 2

Find all solutions to the equation below:

$$\frac{(x+6)^2 + 6}{7} = 10$$

First, multiply both sides by 7.

$$(x+6)^2 + 6 = 70$$

Then, subtract 6 from both sides.

$$(x+6)^2 = 64$$

Undo the squaring. Remember the plus-minus symbol.

$$x+6 = \pm 8$$

Subtract 6 from both sides.

$$x = -6 \pm 8$$

So the two solutions are $x = 2$ and $x = -14$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 10x = -16$$

$$x^2 - 10x + 25 = -16 + 25$$

$$x^2 - 10x + 25 = 9$$

$$(x - 5)^2 = 9$$

$$x - 5 = \pm 3$$

$$x = 5 \pm 3$$

$$x = 8 \quad \text{or} \quad x = 2$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 2x^2 - 28x + 93$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 2 .

$$y = 2(x^2 - 14x) + 93$$

We want a perfect square. Halve -14 and square the result to get 49 . Add and subtract that value inside the parentheses.

$$y = 2(x^2 - 14x + 49 - 49) + 93$$

Factor the perfect-square trinomial.

$$y = 2((x - 7)^2 - 49) + 93$$

Distribute the 2.

$$y = 2(x - 7)^2 - 98 + 93$$

Combine the constants to get **vertex form**:

$$y = 2(x - 7)^2 - 5$$

The vertex is at point $(7, -5)$.